Water Quality Control Concept In Seto Inland Sea

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Thanks to the success of protection policy of maritime environment, water quality in Seto Inland Sea has been getting better. The policy controls total load of organic matters, nitrogen and phosphorous from waste water of industrial and sewage plant. Now a days, the frequency and scale of red tide has got fewer and smaller compared to those in 1960's, and it benefits fishery industry to reduce the risk of red tide damage especially on culture fishery of yellowtail. On the other hand, water quality control of river and waste water and urbanized land use changed from paddy field had reduced nutrients supply from lands and rivers. In cooperation with decline of the area of sea-glass bed and tidal flats, the nutrients control policy is considered to have brought oligotrophication. Recent years, layer fishery has insisted that the growth of layer is constrained due to the oligotrophic sea water, and they have claimed that environmental administrator should increase the nutrients which are strictly restricted by total pollutant load control. In this study, we attempt to build a new concept of evaluation of the water quality control considering the production of fishery industry using a risk management method. According to the recent situation described above, we consider there is an optimal control level of nutrients load which maximize the total production of fishery industry. The impact of nutrients level in the sea water seems to be probabilistic according to past data, therefore, the damage of fishery production by both eutrophication and oligotrophication has to be captured as risk. Here, cost of the risk can be quantified as a price of insurance bond which compensates the damage by the red tides or growth constraints. We define the difference of expected maximum production and the cost as an indicator of the policy impact on fishery. According to this new evaluation concept, the indicator will be low at both too lower and too higher nutrient level and there exist an optimal level of nutrient that maximizes the indicator. We applied this evaluation concept to the water quality control in the sea of Harima-nada, where is located in the eastern part of Seto Inland Sea, based on the statistical analysis using the time series data of production of culture fishery of yellowtail and laver, those damages by red tides, loss of area of sea-glass bed, as well as concentration of TN and TP. As a result, we found the possible benefit in the fishery industry by changing the control policy of waste water.